

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

(12) UK Patent Application (19) GB (11) 2 243 135 (13) A  
(43) Date of A publication 23.10.1991

(21) Application No 9108097.8

(22) Date of filing 16.04.1991

(30) Priority data  
(31) 9008492 (32) 17.04.1990 (33) GB

(71) Applicant  
Thorne Engineering Company Limited  
(Incorporated in the United Kingdom)

Delta Close, St. Faiths Industrial Estate, Norwich,  
Norfolk, NR6 6BG, United Kingdom

(72) Inventor  
David Kellaway

(74) Agent and/or Address for Service  
Gill Jennings & Every  
53-64 Chancery Lane, London, WC2A 1HN,  
United Kingdom

(51) INT CL<sup>8</sup>  
B65B 51/06 61/26

(52) UK CL (Edition K)  
B6C CU36  
B6C CBAK C102 C30X C75X C754  
B6F FAN FBH F203 F259 F269 F525

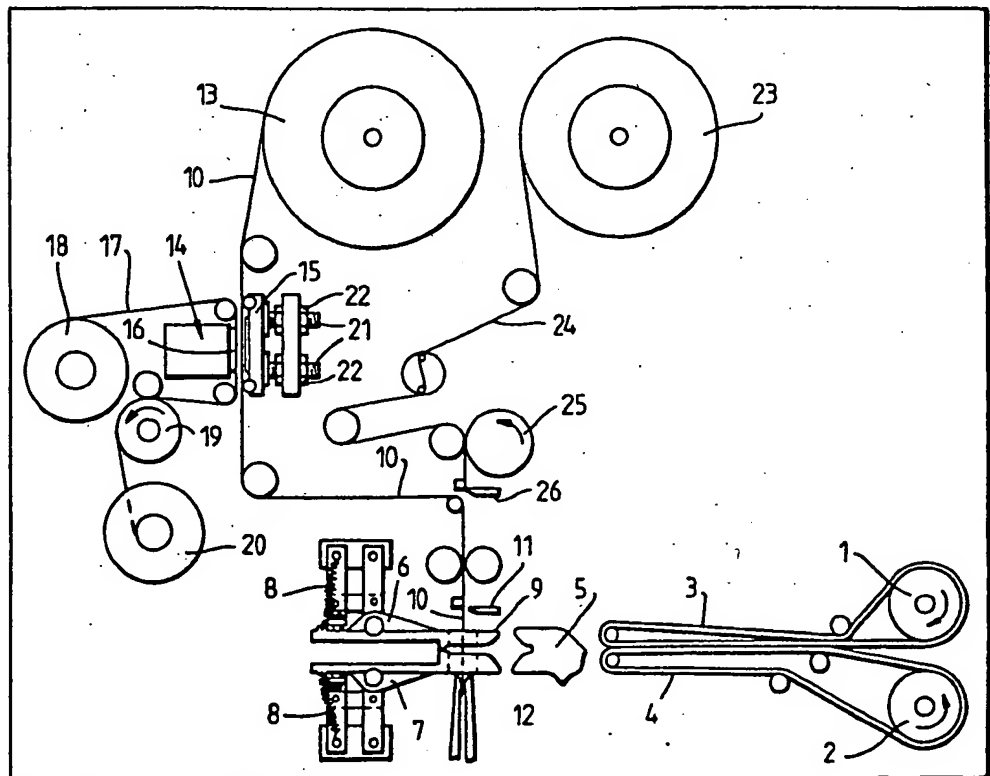
(56) Documents cited  
GB 1516499 A EP 0182544 A

(58) Field of search  
UK CL (Edition K) B6C CBAK CBAL CBAN, B6C  
CU36  
INT CL<sup>8</sup> B65B

(54) Bag tying machine

(57) A bag tying machine having only a single marking head 14 which is arranged to mark an adhesive tape 10 with information which appears at both ends of each completed tie (28). The machine is arranged to sever the tape 10 to form the individual ties (28) in the middle of the information which is printed by the single marking head which is of the hot foil type so that information is present on opposite ends of each tie (28).

Fig.1.



GB 2 243 135 1

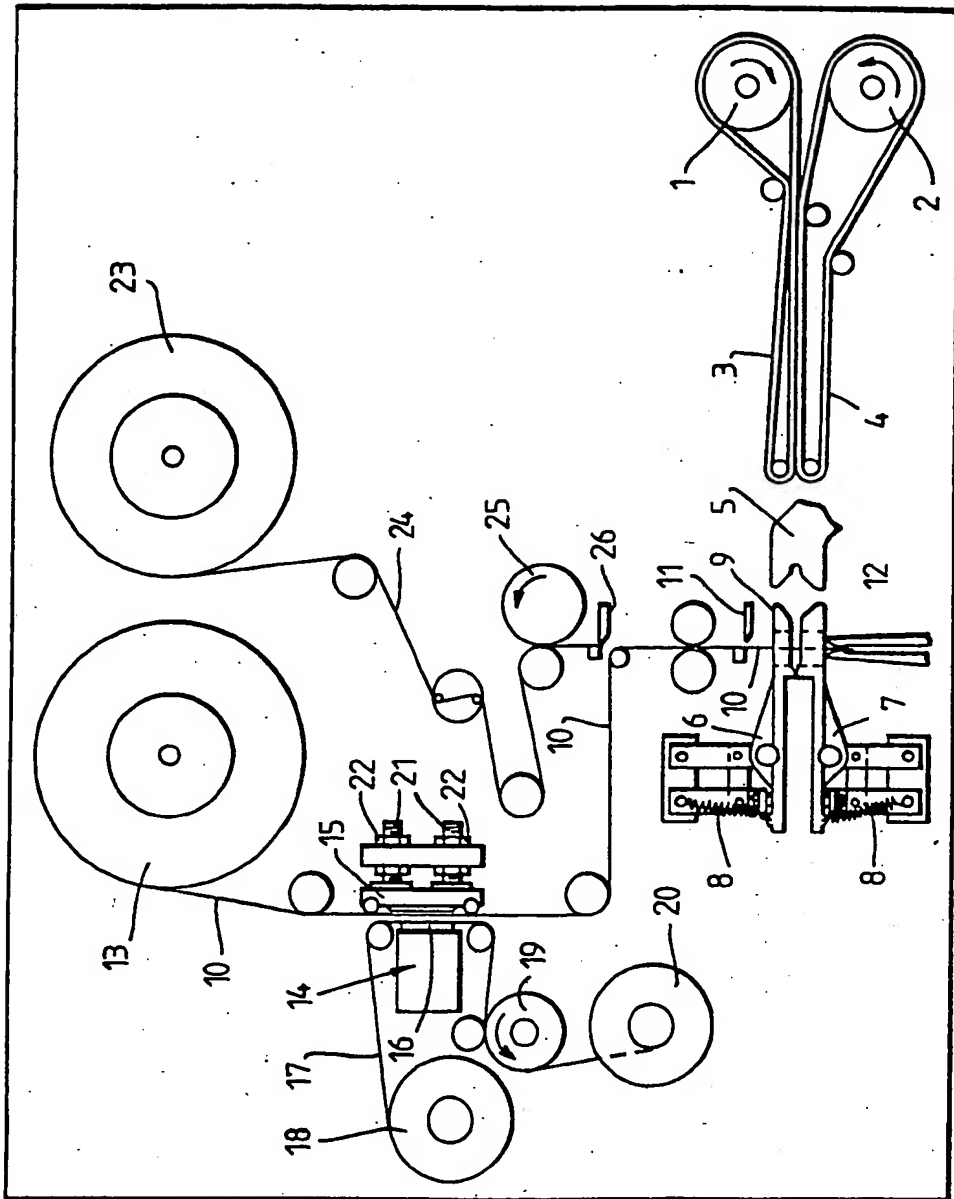


Fig.1.

2/3

Fig. 2.

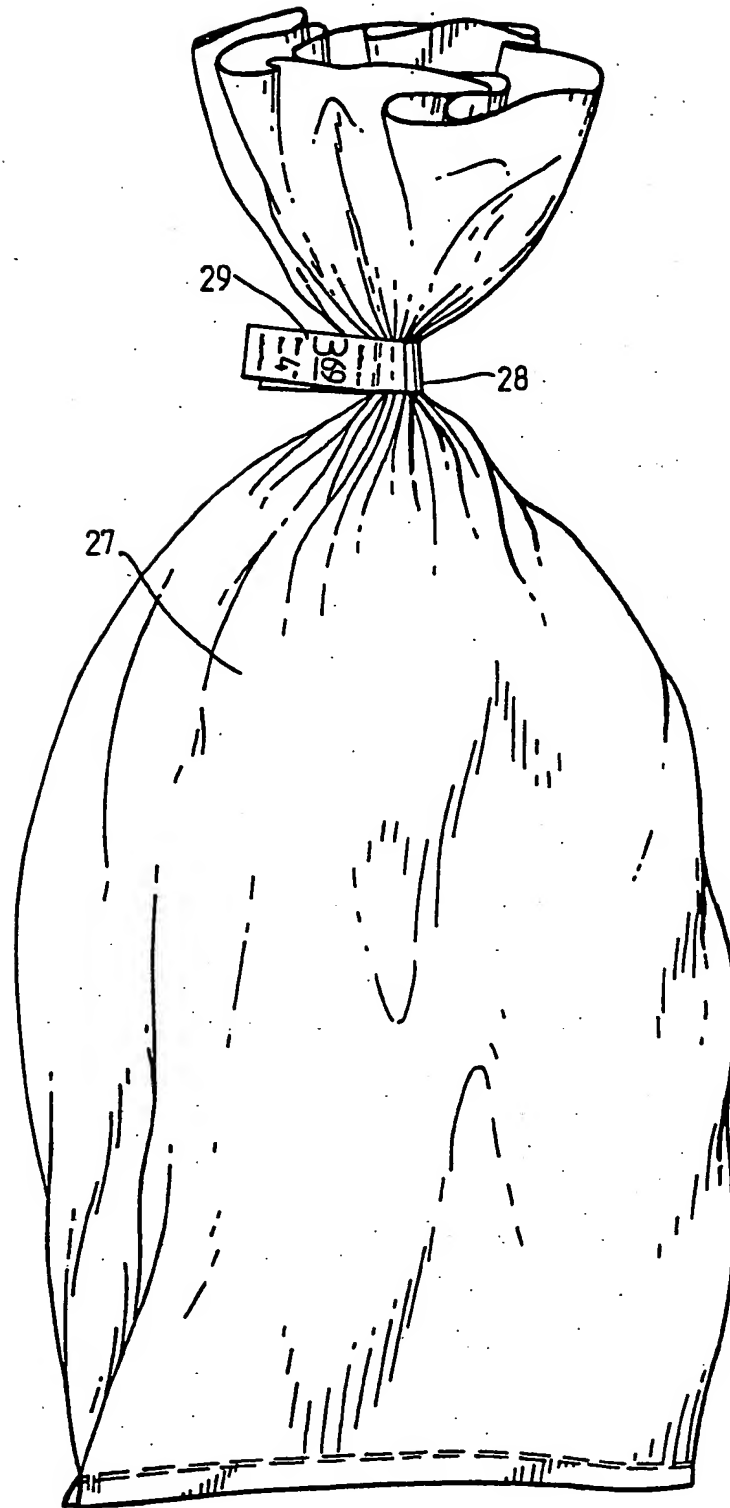


Fig. 3.

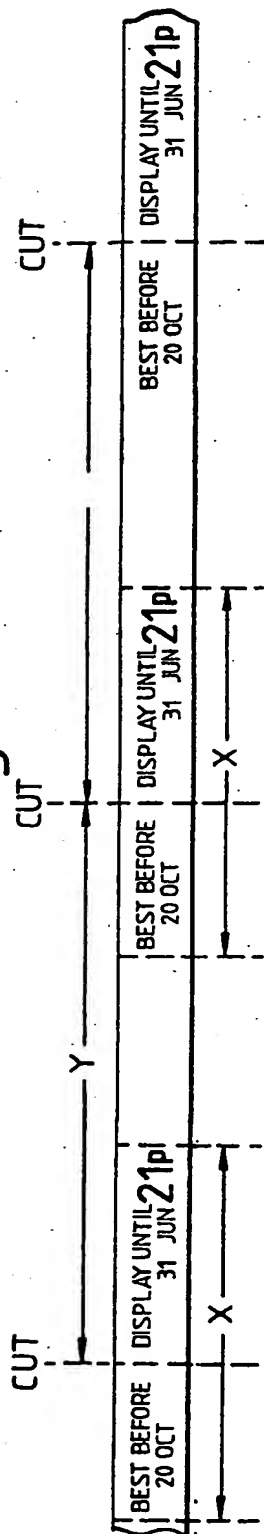
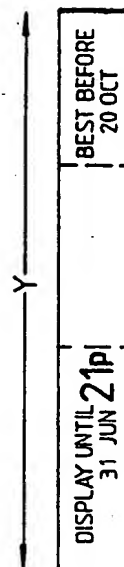


Fig. 4.



BAG TYING MACHINE

Our earlier British patent specification GB-A-1516499 describes and claims a machine for tying bags with an adhesive tape tie, the machine including a marking head which is arranged to mark blank adhesive tape with information relating to the product packaged in the bag.

Bag tying machines in accordance with our earlier specification have been a considerable commercial success and, nowadays, are widely used particularly in the bakery industry. However, there is a requirement to be able to print more information on each adhesive tape tie. It is preferable not to increase the size of the ties and accordingly, one way of achieving this would be to print the information with smaller characters so that more information could be printed on each tie. The bag tying machines that have been most successful commercially are those that produce adhesive tape ties of the flag type in which a single continuous strip of adhesive tape passes around the gathered together neck of a bag and is joined back onto itself to form a seal, the "flag" portion of which extends outwards away from the gathered together neck of a bag. Conventionally, it is this flag portion that carries the information on one of its faces with the other of its faces being blank.

It has been proposed to provide more information on each adhesive tape tie by printing on both sides of it. This requires the use of two separate printing stations in each tying machine with one printing station being used to print the information to appear on one side of the tie and the second printing station being used to print the information that appears on the other side of the tie. It has been proposed for the two printing stations to be spaced apart along the path of the adhesive tape from its supply reel to the tie forming mechanism by a distance corresponding to the length of adhesive tape which is wrapped around the neck of the bag. Typically the

unprinted length of the adhesive tape occupies some 20 to 30mm with the exact length varying with the gauge and the size of the plastics bag being tied. Thus, it is desirable that the separation of the two printing stations and hence the separation of the information printed on the tape by them is adjustable. Taking account of all of these points results in a machine of considerable complexity and which requires adjustment on changing either the gauge or size of the plastic bags being tied.

According to this invention such a bag tying machine has only a single marking head which is arranged to mark the blank tape with information which appears at both ends of each completed tie and the machine is arranged to sever the tape to form the individual ties in the middle of the information which is printed by the single marking head so that information is present on opposite ends of each tie.

By having only a single marking head and arranging for the knife to cut in the middle of the printing, all of the information can be printed using only a single marking head since the parts of the printing appearing on opposite faces of the flag portion of each tie can be printed sufficiently close to one another for the total length of the printing to be printed by a single marking head. The total length of the printing is considerably less than the total length of adhesive tape used to form each tie. Preferably the marking head is of the hot foil type and the bag sealing machine also applies non-adhesive paper tabs to the free ends of the adhesive tape tie as disclosed in our earlier specification GB-A-1516499 or as described in our earlier specification EP 0182544.

An example of a fully automatic bag tying machine in accordance with this invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a diagrammatic view of the essential parts of the machine;

Figure 2 shows the neck portion of a bag tied and marked by the machine;

Figure 3 is a diagram of the printing applied to a length of adhesive tape; and,

Figure 4 is a diagram of the adhesive tape used for each tie.

5       The bag tying machine shown in Figure 1 is arranged beside a conveyor leading away from a bag filling machine, the filled bags being arranged with their open ends towards the tying machine. The open ends of the filled bags pass between rolls 1 and 2 around which pass a pair of endless  
10       belts 3 and 4. The rolls 1 and 2 are driven in counter rotation so that the adjacent surfaces of the belts 3 and 4 move in the same direction to each other and the same direction as the conveyor. The open ends of the bags are thus closed between the belts 3 and 4. A pair of guide  
15       bars (not shown) are arranged with a slot between them which is aligned with the adjacent sections of the belts 3 and 4. A follow-up member 5 reciprocates backwards and forwards and is arranged to move forwards along the path of the ends of the bags as they travel between the guide bars  
20       and the belts 3 and 4 and return out of this path. The follow-up member 5 has a pair of heads one of which is arranged on each side of the guide bars.

After the bag reaches the end of the belts 3 and 4 the follow-up member 5 continues forwards and pushes the bag  
25       against a stop formed by fingers 6 and 7. The fingers 6 and 7 are each supported by a parallelogram linkage and each have a spring 8 to bias them into the position shown in the drawing. The ends of each of the fingers 6 and 7 remote from the spring 8 include an aperture 9 through  
30       which adhesive tape 10 to form a tie passes.

As the follow-up member 5 continues to move forwards it urges the gathered together open end of the bag against this adhesive tape 10, and carrying the adhesive tape 10 with it passes between the nip of the fingers 6 and 7  
35       parting them as it continues. The nip of the fingers 6 and 7 push the adhesive tape 10 around the bag and then adheres the adhesive tape 10 back to itself. As the neck of the



bag passes between the fingers 6 and 7. a knife 11 is arranged to sever the adhesive tape and a pair of grippers 12 release the other end of the tape. The follow-up member 5 then returns to its starting position out of the path of a following bag.

The adhesive tape 10 comes from a supply reel 13 and then passes between a printing head 14 and a pressure pad 15. Conveniently the pressure pad is covered by a free running silicone rubber belt (not shown) so that even though the adhesive tape sticks to the belt it is easily peeled away as the tape is pulled forwards. The tape is then lead to adjacent the knife 11. Whilst the follow-up member 5 is returning the grippers 12 move upwards to grip the severed end of the tape 10 and then move downwards pulling the tape with them and from the supply reel 13. Typically the printing head 14 moves forward to print the piece of tape 10 between the head 14 and the pressure plate 15 at the same time that the grippers 12 release. This allows for some variation in the length of each tie depending upon the extent of the deformation of the tape 10 by the gathered together end of the bag which, in turn, varies with the size and gauge of the bag.

The printing head 14 has a heated type-face 16, a foil 17 coated with a through pigmented polymer comes from a feed roll 18 across the front of the type-face 16 between the nip of a pair of driving rolls 19 and on to a take-up spool 20. The drive rolls 19 are arranged to move the foil 17 a sufficient distance after each stroke of the printing head 14 so that a fresh piece of foil is positioned over the type-face ready for the next printing stroke. The pressure pad 15 and belt assembly is adjustably fixed by threaded studs 21 and nuts 22 so that the printing pressure may be varied. When the printing head is moved towards the pressure pad 15 it sandwiches the foil 17 and the tape 10 between the heated type-face 16 and the pressure pad 15 and belt. A layer of the pigmented polymer is transferred from

the foil 17 and welded onto the non-adhesive face of the tape 10. The printing head 16 then moves back.

5 A reel 23 holds paper tape 24 which is fed from the reel 23 between the nip of a pair of drive rolls 25 and past a knife 26. Short lengths of paper tape 24 are applied to the adhesive face of the tape 10 and the knife 11 is arranged to cut through the middle of one of the lengths of paper tape 24. Thus each tie formed around the neck of a bag has a paper tab at each of its ends which  
10 enables a user to separate the ends of the tie and remove the tie from the bag.

Figure 2 shows a bag 27 which has been tied by a machine in accordance with the invention. A tie 28 is shown around the gathered together open end of the bag 27  
15 and information 29 is printed on the "flag" part of the tie which is adhered to itself. Figure 3 illustrates a length of the adhesive tape 10 showing the successive printing impressions made on it by the printing head 14. Figure 3 also illustrates the position at which the adhesive tape  
20 will be cut by the cutters 11 during the formation of each tie. Figure 3 further illustrates how the total length X of the printed information applied on each stroke of the printing head 14 is considerably less than the total length Y and Y' between the printing appearing on each adhesive  
25 tape tie and thus shows how the printing head 14 is much more compact and results in much less waste of the polymer coated ribbon 17 than would occur if both ends of each tie were printed during the same operation. Further, Figure 3 also illustrates how, if the length Y varies to Y',  
30 depending on how much tape is pulled past the cutting blades 11 by the grippers 12 and the action of the pusher 5 compressing the gathered together end of the bag against the tape 10 before operation of the cutting blades 11 to vary the length Y to Y' how the position of the printing at  
35 the ends of the tie in accordance with this invention is completely unaffected. Whereas, if each tie was printed in only a single operation of the printing head some account

w uld have to be taken of this in designing the spacing of the information on the printing head to take account of variations in length of the completed tie.

5 Figure 4 illustrates a completed tie showing how different printed information is provided at opposite ends of it as a result of two consecutive operations of the printing head 14.

CLAIMS

1. A machine for tying bags comprising at least one carrier for holding a storage reel of blank pressure-sensitive adhesive tape, a mechanism for forming a tie from the adhesive tape and applying the tie around the gathered together open end of a bag containing a product so that the tie closes the gathered together bag, and a marking head which is arranged to mark blank tape with information relating to the product packed in the bag characterised in that the machine has only a single marking head which is arranged to mark the blank tape with information which appears at both ends of each completed tie and the machine is arranged to sever the tape to form the individual ties in the middle of the information which is printed by the single marking head so that information is present on opposite ends of each tie.
2. A machine according to claim 1, in which the marking head of the machine is arranged adjacent the path of the adhesive tape from its carrier to the mechanism, so that the head marks the tape after it is taken from the storage reel but before it is formed into a tie and applied to the bag.
3. A machine according to any of the preceding claims, in which the marking head is of the hot-foil type.
4. A machine according to any of the preceding claims, which forms the tie from a single strip of adhesive tape which encircles the gathered together neck of the bag and the free ends of which are adhered to each other with their adhesive sides towards one another.
4. A machine according to any of the preceding claim, which forms the tie from a single strip of adhesive tape which encircles the gathered together neck of the bag and the free ends of which are adhered to each other with their adhesive sides towards one another.
5. A machine according to any of the preceding claims, wherein non-adhesive tabs are applied to the free ends of the tie.